and those who still remain in all their primitive freedom of the hills." This freedom, however, consists of a long and bitter struggle to raise their scanty crops on the hardly-wrought clearances of the virgin forest. Among the other enemies to their agricultural pursuits, Capt. Forbes mentions the visitations of vast hordes of "hill rats," which at long intervals of forty or fifty years settle on a tract of country for two or three years in succession, "till, like a swarm of locusts, they have reduced it to a desert." When on the move, in vast swarms, they cross the streams in shoals, so that the water is black with them, and from 1870 to 1874 they so devastated the hill country east of the Sittoung river that government was compelled to expend some 10,000*l.* in relieving the local Karen tribes.

The chapters upon Burman Buddhism must not pass without notice. Buddhism is not a subject quite suitable to the columns of NATURE, but there is exhibited in the short treatment of it such an intelligent appreciation of a vast system of philosophy, unaccompanied by narrow prejudice or preconceived ideas, as, if not perfect, proves the author to be capable of conducting investigations on thoroughly scientific principles.

W. L. D.

OUR BOOK SHELF

From Kulja, across the Tian Shan, to Lob-Nor. By Col. N. Prejevalsky. Translated by E. Delmar Morgan. With Introduction by Sir J. Douglas Forsyth, C.B. (London: Sampson Low and Co., 1879.)

COL. PREJEVALSKY has already proved himself one of the most scientific and determined of modern explorers, and has probably done more than any single man for an accurate knowledge of Central Asia. We have noticed in these pages his valuable work on his journey in Mongolia and Western China, and this narrative, short as it is, maintains the reputation he has already gained. The journey here described was made in 1876-7, and has been the means of clearing up several obscurities in the hydrography of the region visited. We have already, shortly after Prejevalsky's return, given the main results of the journey, from Kulja, south-east across the Tian Shan Mountains, by the Yulduz River, to the Tarim, and along that river to its termination in Lake Lob-nor, at the northern foot of the Altyn-tagh Range, on the 90th deg. of E. long., and just south of the 40th parallel N. Baron von Richthofen has endeavoured to prove that the present Lob-nor is not the Lob-nor of the old geographers, which he maintains was farther north. But to this Prejevalsky has an answer that it seems to us difficult to refute, notwithstanding that Richthofen probably knows more about the history of Central Asian geography than any one living. However the case may stand with regard to this, there can be no doubt about the value of Prejevalsky's observations on the present Lob-nor, which he states is fresh, shallow, almost overgrown with tall reeds, in the midst of which its strange mongrel inhabitants live, and of which they build their houses. The Altyn-tagh Mountains Richthofen considers the most surprising discovery of the Russian traveller, for it was generally supposed that there was an extensive tract of low country continuing through several degrees of latitude to the south of the lake. Prejevalsky's observations on the fauna of the Tarim and Lob-nor will be appreciated by zoologists, as will also his account of the wild camel. He has a special interest in ornithology, and above all in that department relating to the migrations of birds; and the part of his narrative which describes what he observed on this point during his stay at Lob-nor is one of exceptional value, and will, no doubt, be read with interest and profit by those who take an interest in the subject of migration. Mr. Delmar Morgan, who has made an excellent translation, has added to the brief narrative chapters on Lake Balkash, Lake Ala-Kul, and the Starovertsi, which, though somewhat irrelevant, are acceptable as being of real value. An excellent large map accompanies the volume, besides a smaller one, to illustrate the controversy between Prejevalsky and Richthofen.

A Manual of Practical Chemistry: The Analysis of Foods and the Detection of Poisons. By Alexander Wynter Blyth, M.R.C.S., F.C.S., &c. (London: Charles Griffin and Co., 1879.)

THIS work of 468 pages consists of two divisions, the first treating of the analysis of the principal articles of diet in daily use, the second of the detection and estimation of certain organic and inorganic poisons. The matter pertaining to the first division is further divided into seven parts, in which the different articles of diet are considered in their proper groups. These chapters are well and pleasantly written, bringing the information as much as possible up to date, and introducing where necessary modern methods of analysis. This may be seen in the chapter on sugars, where a full description of the optical method for the estimation of these bodies by the polariscope is given, with an accompanying diagram of the various parts, lenses, &c., of Soleil's saccharimeter. The remaining portions of the first division contain the matter concerning bread and flour; milk, butter, tea, coffee, cocoa, &c.; the chapter on tea and coffee containing a large number of analyses which no doubt will prove of great use. A considerable part of the book is devoted to the examination of alcohols, wines, and beers, in which instructions are laid down for the examination of such substances. In connection with this part the author gives a reprint of the tables introduced by M. A. Gautier for the systematic detection of colouring matters likely to be met with in wines, and gives an abstract of Gautier's paper containing the necessary instructions for the preparation of the sample, &c., to be examined.

The second division of the book contains the detection and estimation of the different poisons, the consideration of the organic preceding that of the inorganic. Although the information conveyed by the author is exact and well arranged with regard to the individual tests for each separate poison, it is to be regretted that he has not thought it necessary to develop more fully his remarks on a systematic course to be employed in the separation of the different poisons from each other. In many cases where doubtful evidence of poisoning exists a most exhaustive analysis is required, and we fear the general instructions laid down in the book for this purpose, or "method of procedure in analysis," as the author terms it; are somewhat insufficient.

The organic poisons and the detection of phosphorus are first taken into account in two divisions, first, those detected mainly by methods of distillation, and second, those separated for the most part by alcoholic solvents. The consideration of mineral poisons is placed last in the book, and contains the usual received tests for these substances, with in some cases a description of the body. With regard to this latter part we do not see why in a book published so recently as 1879 there are no remarks on the detection or separation of tin as a poison since it has been shown in letters to some of the journals that this metal may contaminate articles of food, more especially tinned fruits.

The work is clearly printed, but some of the diagrams are somewhat crudely cut, and if refinement in the arrangement of apparatus is intended in the illustrations, hardly carry out the intention; thus in Fig. 15 it is diffi-

cult to see from the drawing what is meant in the arrangement figured between the washing bottle and the French drying tube. There are some traces also of careless printing, which it would be well to rectify in future editions, as in the equation of the action of arseniuretted hydrogen on silver nitrate on p. 372. The title of the book is also somewhat presumptuous; it is styled "A Manual of Practical Chemistry:" the two last words being in large type; a colon is here introduced and then follows the exact title of the book in smaller type, "The Analysis of Foods and the Detection of Poisons." The work cannot be fairly described as a Manual of Practical Chemistry, and the title should therefore have been restricted to the matter actually contained in the book.

LETTERS TO THE EDITOR

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.*

[*The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to ensure the appearance even of communications containing interesting and novel facts.*]

On the Spectrum of Brorsen's Comet

WITH reference to Prof C. A. Young's Note on the Spectrum of Brorsen's Comet, in NATURE, vol. xix. p. 559, it may be of interest to mention that observations made at the Royal Observatory, Greenwich, confirm his conclusion as to the coincidence of the brightest band in the comet spectrum with the green band of carbon.

We were not able to examine the comet's spectrum till April 17, as the Great Equatoreal was in the workmen's hands till that date for alterations required to allow of the more convenient use of the spectroscope. On that evening, and again on April 19, the comet's spectrum was repeatedly compared by Mr. Maunder and myself, with the spectrum of alcohol taken in a vacuum tube. The less refrangible edge of the brightest comet-band coincided as exactly as could be determined with the corresponding edge of the green carbon-band at 5,200, but the comet-band was very much wider, extending two-thirds of the way towards F (*i.e.*, about 200 tenth-metres), and covering the carbon-band at 5,200 (about 30 tenth-metres broad) and the two following fainter bands at 5,100 and 5,020. The comparisons were made on April 17 by the help of an occulting bar, and on April 19 with Hilger's bright-line micrometer, illuminated by red light. With the latter, readings for the comet- and carbon-bands respectively, agreed within half a tenth-metre. The half prism spectroscope with a dispersion of 10° from A to H (equivalent to two prisms of 60°) was used on the 13-inch equatoreal. From spectroscopic observations of the carbon compound, printed in the volume of Greenwich Observations, 1875, it appears that the bands in the spectrum of alcohol are identical with those in the spectra of olefiant gas, and of carbon oxide and dioxide.

A second band was seen in the orange of the comet's spectrum approximately coincident with the carbon band at about 5,600. This band was of about one-fourth the brightness of the principal band.

The results on April 17 were obtained without a knowledge of Prof. Young's work, and thus afford an independent confirmation of his conclusion. W. H. M. CHRISTIE

Royal Observatory, Greenwich, April 21

Blue Flame from Common Salt

I AM perfectly aware that, as Dr. Gladstone points out in your last issue, I have not *proved* HCl to be the origin of the blue flame, but I will give some of my reasons for *thinking* so.

In the first place I conclude every one will admit that chlorine in some form must be present, since only chlorides produce the flame. At one time I thought it was due to dissociated or atomic chlorine; that view, however, I discarded in favour of the hydrochloric acid theory.

When AmCl is heated, dissociation occurs, as is well known, NH_3 and HCl being formed; the HCl then plays its part in producing the blue flame. If calomel be used, it is natural to imagine that the mercury and chlorine are separated, and if the colour is due to HCl, the addition of hydrogen will be necessary before the flame is produced. As a matter of fact I have found that no coloration occurs if the calomel is heated in what I may perhaps be allowed to call the *solid* part of the Bunsen flame, *i.e.* where complete combustion takes place, but it is necessary to allow some of the unburnt gas to mingle with its vapour. In practice I adjust the wire gauze over the burner so that a black spot is seen surrounded by a red hot ring, a little calomel placed on the dark spot volatilises and colours the gas that is burning above the gauze; if the gauze is raised so that the dark spot vanishes and all is red hot, the salt volatilises without any coloration ensuing.

Although I have not been able to see any violet bands when a spark has been taken in HCl, I do not consider that it negatives my theory, since there is a considerable difference between an electric spark and a Bunsen flame, and I now have reason to think that under the influence of the spark the HCl is split up into its components, which will fully account for the absence of violet bands. I have likewise failed to get them from a spark in AmCl.

A drop of liquid HCl, introduced into a Bunsen flame by the aid of a platinum wire, gives a flash of blue colour, and a lighted taper immersed in a bottle of HCl gas has its flame surrounded by a blue mantle just before it goes out. The colour, to the eye, is identical in both cases to that produced by the volatilisation of a chloride, the peculiar violet tinge showing that it must contain rays of high refrangibility.

Lastly, if a stream of HCl gas be slowly passed into a large Bunsen flame, the colour is produced most vividly, the spectrum showing all the characteristic lines or bands. Here we have the HCl under the same conditions as the chloride and with a similar result.

Dr. Gladstone appears not to have obtained the flame by this method, since he says: "Hydrochloric acid passed into a flame never gives the violet light."

This may probably be explained by the fact that if the HCl be passed too rapidly the violet coloration gives place to green, similar to that produced by chlorine alone if the stream of gas be allowed to slacken, the violet is reproduced, and this may be repeated indefinitely. A. PERCY SMITH

Temple Observatory, Rugby, April 26

Did Flowers Exist during the Carboniferous Epoch?

ACCORDING to the position Mr. Wallace has taken in the discussion as to the order of insects to which *Breyeria borinensis* presumably belongs, everything depends upon the existence or non-existence of transverse reticulation. I re-assert that a regular and thoroughly well-marked transverse reticulation exists over all the wing.

If Mr. Wallace prefers to believe in the evidence afforded by a photograph in preference to my statement based upon actual examination, and to M. de Borre's words in his description ("Entre toutes ces nervures s'étend un réseau extrêmement complet de très-fines nervules allant transversalement d'une grosse nervure à l'autre"), it is evident that anything I could say would not alter his opinion.

Further, I utterly fail to comprehend by what process of reasoning he arrives at the conclusion that the photograph "is so beautifully sharp that it brings out the minutest details," when confessedly he has not compared that photograph with the original.

That the main nervures may be compared with some forms in Lepidoptera and found to agree to a certain extent is very possible; it would be singular if it were otherwise, considering the extreme variation in the neuration of Lepidoptera, and the practical certainty that the system of neuration in all orders of insects can be homologised. The presence of dense *transverse* reticulation in a lepidopterous insect would decidedly be an anomaly; but its absence would not prove that any particular fossil *did not* belong to the Ephemeridæ, for in some recent genera of the latter, such as Oligoneuria, Lachlania, &c., the transverse reticulation is so far absent as to be reduced to a few nervules that might be counted on the fingers of one hand.

Supposing, for the sake of argument, that my assertion may be based upon false premises (and no one is infallible), *Breyeria* would probably be relegated to that heterogeneous assemblage of extinct forms of insects possessing densely reticulate wings, to